

**DRAFT**  
**Engineering Evaluation**  
**Atlantic Richfield Company c/o URS Corporation; Plant Number 17694**  
**Application Number 14373**

***Background***

On behalf of Atlantic Richfield Company (ARCO), URS Corporation (URS) has applied for an AC/PO for equipment necessary for soil remediation at the former site of BP Oil Service Station #11232 located at 603 Old San Francisco Road in Sunnyvale. Remediation activities include both a Groundwater Treatment System (GTS) and Soil Vapor Extraction (SVE) System. SVE will be accomplished by means of a regenerative vacuum blower (S-1) with a maximum operating capacity of 200 scfm. The vacuum unit is also equipped with a water knockout vessel, inlet filter, dilution air valve, recirculation valve, and flow indicators. The GTS will consist of an airstripper (S-2) operating at a liquid flow rate of 15 gallons per minute. Vapor effluent from the GTS will be ducted to that from the SVES. Vapor abatement for both systems will be achieved by carbon adsorption (Carbon). The carbon system will consist of at least two 180 pound minimum capacity activated carbon vessels connected in series.

The Carbon unit influent and effluent VOC concentrations will be monitored with a portable flame-ionization detector (OVA-FID) on a schedule reflecting current loading rates and predicted Carbon capacity. To ensure proper operation of equipment and verify attainment of steady-state conditions, Carbon performance will be monitored daily for the first five days. URS may then elect to change their monitoring schedule based on measured influent concentrations and calculated carbon loading. Monitoring schedule changes will be allowed only after District review of concentration measurements and subsequent receipt of District approval.

This source is located within 1,000 feet of the outer boundaries of both Ellis Elementary and Saint Martin's Schools. In addition, Braly Elementary School is within ¼ mile of the source. As such, this application requires Public Notification via Reg. 2-1-412. A Public Notice was prepared and sent out to the home address of the students of the three schools and to each address within a radius of 1,000 feet of the source. Copies of the Public Notice were sent to the Principals of the schools. This Evaluation Report was posted on the District Webpage along with the Public Notice. A phone line was set-up at the district to receive public comments and ?? were received.

Attached to this report are copies of the Public Notice, and a summary of the Public comments received. The total cost of the Public Notification amounted to \$----.00. This amount did not exceed the \$2000.00 Public Notice fee; the balance will be refunded to the applicant. All fees including the standard AC/PO fees of \$---.00 have been paid.

***Emission Calculations***

**S-1: Soil Vapor Extraction System**

**Assumptions:**

For a conservative estimate of yearly emissions, we shall assume that the system is operated for an entire year with an inlet concentration corresponding to the initial soil concentration level. Generalized assumptions follow:

- \* Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21°C; 1 mole occupies 24.15 l.
- \* Molecular weight of TPHg = 100 g/mole (value for "weathered gasoline"). Molecular weight of Benzene = 78 g/mole.
- \* Influent values based on operational parameters of equipment and applicant supplied soil vapor test results: influent rate = 200 scfm throughout; maximum influent concentration = 1000 ppmv POC, 10 ppmv Benzene; abatement efficiency = 90% each carbon vessel, 99% aggregate.

### Emissions of Precursor Organics (S-1):

$$1000\text{E-}6 * \frac{200 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32 \text{ l}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15 \text{ l}} * \frac{100 \text{ g}}{\text{mole}} * \frac{1 \#}{454 \text{ g}} * (1 - 0.99) = \mathbf{7.4\text{E-}1 \#/\text{day}} \text{ (abated)}$$

### Emissions of Toxic Air Contaminants {benzene} (S-1):

$$10 \text{ E-}6 * \frac{200 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32 \text{ l}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15 \text{ l}} * \frac{78 \text{ g}}{\text{mole}} * \frac{1 \#}{454 \text{ g}} * (1 - 0.99) = \mathbf{5.8\text{E-}3 \#/\text{day}} \text{ (abated)}$$

## S-2: Ground Water Treatment System

### Assumptions:

- \* Contaminant concentrations in ground water: 38 ppmw POC, 6.1 ppmw benzene (based on groundwater sampling provided by URS).
- \* Emission factors based on manufacturer guarantees. Limiting factor is the pump capacity of 15 gal/min. Liquid phase hydrocarbon removal efficiency of stripper = 100%. Liquid flow rate = 15 gal/min. Abatement efficiency = 90% each carbon vessel, 99% aggregate.

### Emissions of Precursor Organics (S-2):

$$38\text{E-}6 * \frac{15 \text{ gal}}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{8.337 \#}{1 \text{ gal}} * (1.0) * (1 - 0.99) = \mathbf{6.8\text{E-}2 \#/\text{day}} \text{ (abated)}$$

### Emissions of Toxic Air Contaminants {benzene} (S-2):

$$6.1\text{E-}6 * \frac{15 \text{ gal}}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{8.337 \#}{1 \text{ gal}} * (1.0) * (1 - 0.99) = \mathbf{1.1\text{E-}2 \#/\text{day}} \text{ (abated)}$$

### Combined Emissions of Precursor Organics:

Highest Daily Emissions	=	<b>2.82 #/day</b>
Annual Average	=	<b>2.82 #/day</b>
RFP	=	<b>0.52 t/yr</b>

### Combined Emissions of Toxic Air Contaminants {benzene}:

Highest Daily Emissions	=	<b>1.68E-2 #/day</b>
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### *Toxics*

Under the trigger levels as per Regulation 2-1-316, the emissions of toxic substances (Benzene = 0.017 #/day) are not considered sufficient to warrant a Risk Screen Analysis. Benzene trigger = 0.018 #/day. In accordance with the Toxic Section Risk Management Policy, the impact is then insignificant. Operating conditions need not include

emission limits as Carbon change-out requirements will ensure TBACT level control. Emissions do not pose an unacceptable level of risk to the surrounding community and thereby do not merit specific limits.

### ***New Source Review***

This proposed project will not emit over 10 lbs per highest day and is therefore not required to implement BACT; however, it will be achieved in practice. For Soil Vapor Extraction operations, BACT is defined as attainment of set destruction efficiencies corresponding to set influent concentration values. Operation of the thermal oxidizer, and the Carbon vessels will be conditioned to ensure attainment of the following required destruction efficiencies:  $\geq 98.5\%$  if inlet POC  $\geq 2000$ ;  $\geq 97\%$  if inlet POC  $\leq 2000$  to  $>200$  ppmv;  $\geq 90\%$  if inlet POC  $<200$  ppmv. Offsets need not be imposed as annual emissions will not exceed 15 tons.

### ***CEQA***

The project is considered to be ministerial under the District's proposed CEQA Regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors and therefore is not discretionary as defined by CEQA.

### ***Compliance***

Based on the information submitted, this operation is expected to be in compliance with Regulation 8-47-301, Emission Control Requirements, Specific compounds and Regulation 8-47-302, Organic Compounds. The POC emissions will be vented through a carbon adsorption system at all times of operation. The application triggered Public Notification as required by Regulation 2-1-412. Public Notification was performed by the District and URS was invoiced for the services required. Fees in the amount of \$----.00 (including the standard A/C and P/O fees) have been paid in full.

### ***Recommendation***

Recommend that a conditional Authority to Construct be issued for sources:

- S-1: Soil Vapor Extraction System consisting of a 200 max scfm vacuum blower, and ancillary equipment, abated by A-1, at least two (180 lb minimum capacity) carbon adsorption vessels arranged in series.
- S-2: Groundwater Treatment System consisting of a 15 gpm max capacity Air Stripper, and ancillary equipment, abated by A-1, at least two (180 lb minimum capacity) Carbon Adsorption Vessels arranged in series.

### ***Conditions***

1. Sources S-1 and S-2 shall be vented at all times to A-1, at least two (180 lb minimum capacity) activated carbon vessels arranged in series. Influent soil vapor flow shall not exceed 200 scfm. Groundwater flow rate into S-2 shall not exceed 15 gpm. [basis: Reg. 8-47-301,2]
2. For each of the first three days of operation of the S-2, at least one influent groundwater sample shall be collected and analyzed. At least one sample shall be collected and analyzed thereafter for each calendar month of operation. Samples shall be collected in accordance with the Regional Water Quality Control Board's analytical methods. [basis: Reg. 8-47-601]
3. The operator of this source shall monitor with a photo-ionization detector (PID), flame-ionization detector (FID), or other method approved in writing by the District's Source Test Manager at the following locations:

- a. At the inlet to the second to last carbon vessel in series.
- b. At the inlet to the last carbon vessel in series.
- c. At the outlet of the carbon vessel that is last in series prior to venting to the atmosphere.

When using an FID to monitor breakthrough, readings may be taken with and without a Carbon filter tip fitted on the FID probe. Concentrations measured with the Carbon filter tip in place shall be considered methane for the purpose of these permit conditions.

4. These monitor readings shall be recorded in a monitoring log at the time they are taken. The monitoring results shall be used to estimate the frequency of Carbon change-out necessary to maintain compliance with conditions number 4 and 5, and shall be conducted on a daily basis. The operator of this source may propose for District review, based on actual measurements taken at the site during operation of the source, that the monitoring schedule be changed based on the decline in organic emissions and/or the demonstrated breakthrough rates of the carbon vessels. Written approval by the District's Engineering Division must be received by the operator prior to a change to the monitoring schedule.
5. The second to last Carbon vessel shall be immediately changed out with unspent Carbon upon breakthrough, defined as the detection at its outlet of the higher of the following:
  - a. 10 % of the inlet stream concentration to the Carbon vessel.
  - b. 10 ppmv (measured as Hexane).
6. The last Carbon vessel shall be immediately changed out with unspent Carbon upon detection at its outlet of 10 ppmv (measured as Hexane).
7. The operator of this source shall maintain the following records for each month of operation of the source:
  - a. The hours and times of operation.
  - b. Each monitor reading or analysis result for the day of operation they are taken.
  - c. Total throughput of groundwater through Source S-2 in thousands of gallons.
  - d. The number of Carbon beds removed from service.

All measurements, records and data required to be maintained by the operator shall be retained and made available for inspection by the District for at least two years following the date the data is recorded.

[basis: Reg. 1-523]

8. Any non-compliance of these conditions shall be reported to the Compliance and Enforcement Division at the time that it is first discovered. **The submittal shall detail the corrective action taken and shall include the data showing the exceedance as well as the time of occurrence.**
9. Upon final completion of the remediation project, the operator of Sources S-1 and S-2 shall notify the Engineering Division within two weeks of decommissioning the operation.

by \_\_\_\_\_ date 7/18/06

Robert E. Cave  
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